Amendments to the Claims:

The listing of claims below will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (previously presented): An apparatus comprising a first photosensitive sol-gel derived thin film on a substrate, said sol-gel film including at least first and second spaced apart regions which include SiO_2 with a comparatively higher index of refraction channel therebetween, wherein said channel comprises a metal oxide doped silica region of Si - O - M - O -Si where M is a metal, said metal oxide is photodeposited from an organometallic photosensitzer, and said channel includes different indices of refraction along the axis thereof.

Claim 2 (previously presented): The apparatus as in claim 1 wherein said substrate comprises glass.

Claim 3 (previously presented): The apparatus as in claim 1 wherein said substrate comprises silicon, said substrate including a surface layer of silicon dioxide.

Claim 4 (previously presented): The apparatus as in claim 1 wherein said channel includes at least a portion comprising alternating regions of different concentrations of photodeposited metal oxide, and thereby indices of refraction, for defining a grating.

Claim 5 (previously presented): The apparatus as in claim 4 wherein the period of the grating varies along the axis of said channel.

Claim 6 (previously presented): An apparatus comprising a substrate having a silica surface layer, said apparatus including a thin sol-gel glass film thereon, said thin sol-gel film including therein at

least a first metal oxide waveguide channel having a comparatively high refractive index as compared to surrounding portions of said thin sol-gel film, wherein said metal oxide is photodeposited.

Claim 7 (previously presented): The apparatus as in claim 6 also including first and second electrodes formed astride said metal oxide waveguide channel, and wherein said channel exhibits electro-optic properties and is responsive to a voltage impressed thereon by said electrodes to vary the index of refraction locally therein.

Claim 8 (currently amended): The apparatus as in claim 7 wherein said ~~sold-gel~~ sol-gel film includes a plurality of metal oxide waveguide channels each comprising metal oxide doped silica regions of Si - O - M - O - Si where M is a metal taken from a class consisting of Groups IVA, IVB, VIB, and transition metals and rare earth metals from the periodic table, and the index of refraction in said channels is different in each.

Claim 9 (previously presented): The apparatus as in claim 6 wherein said substrate comprises a glass.

Claim 10 (previously presented): The apparatus as in claim 6 wherein said substrate comprises silicon having a surface layer of silicon dioxide.

Claim 11 (previously presented): An apparatus comprising a substrate having a silica surface layer, said apparatus including a thin sol-gel glass film thereon, said sol-gel film including therein at least first and second photodeposited metal oxide waveguide channels, said channels being in close

proximity only in a first region thereof, and said apparatus including signal-responsive means for switching light signals from said first to said second channel controllably.

Claim 12 (canceled)

Claim 13 (canceled)

Claim 14 (canceled)

Claim 15 (canceled)

Claim 16 (canceled)

Claim 17 (canceled)

Claim 18 (previously presented): The apparatus as in claim 1 wherein the index of refraction in said channel changes in a manner to define spaced apart Bragg gratings for reflecting light therebetween.

Claim 19 (canceled)

Claim 20 (previously presented): The apparatus as in claim 1 further including first and second electrodes adjacent to said channel at first and second interfaces of said first and second spaced apart regions.

Claim 21 (canceled)

Claim 22 (previously presented): The apparatus as in claim 20 also including means for impressing a voltage between said first and second electrodes.

Claim 23 (previously presented): The apparatus as in claim 1 wherein a portion of said channel comprises a photodeposited magnetic material, said apparatus also including means for generating a magnetic field in at least said portion of said channel.

Claim 24 (previously presented): The apparatus as in claim 22 wherein said electrodes are adjacent to a first portion of said channel and said channel divides into first and second derivative channels at said portion.

Claim 25 (previously presented): The apparatus as in claim 23 wherein said means for generating is adjacent to a first portion of said channel and said channel divides into first and second derivative channels at said portion.

Claim 26 (previously presented): The apparatus as in claim 1 having a plurality of said channels therein extending from a common input to a common output, each of said channels having a different radius of curvature for providing a low loss transmission path for a different wavelength therein.

Claim 27 (previously presented): The apparatus as in claim 26 also including fiber optic means for introducing at said input light having a band of wavelengths including each of said different wavelengths.

Claim 28 (previously presented): The apparatus as in claim 27 wherein said film includes means for dividing said band of wavelengths into a set of individual wavelengths, one for each of said channels.

Claim 29 (previously presented): The apparatus as in claim 27 including at least a second sol-gel film on said first sol-gel film, said second sol-gel film also including a plurality of said channels therein extending from a common input to a common output, each of said channels in said second film having a different radius of curvature for providing a low loss transmission path for a different wavelength therein.

Claim 30 (previously presented): The apparatus as in claim 28 having first and second optical fibers coupled to the common inputs of said first and second film respectively for introducing input light having a band of wavelengths including each of said different wavelengths.

Claim 31 (canceled)

Claim 32 (canceled)

Claim 33 (currently amended): An integrated optic device having a spatially varying refractive index profile comprising:

(a) a substrate;

(b) a photosensitive sol-gel derived thin film on a substrate, said sol-gel film including a spatially varied refractive index profile and being formed by a process comprising: i.) forming a photosensitive sol-gel film on [[a]] the substrate, ii.) exposing the photosensitive sol-gel film through a gray scale mask to light, wherein the gray scale mask includes a gray scale image corresponding to the integrated optic device, and iii.) heat treating the exposed sol-gel film.

Claim 34 (previously presented): An integrated optic device comprising:

(a) a substrate; and

(b) a photosensitive sol-gel derived film layer disposed on said substrate, said sol-gel film comprising an embedded waveguide channel having different concentrations of photodeposited metal oxide along the axis of said channel thereby resulting in different photoinduced indices of refraction along the axis of said channel.

Claim 35 (previously presented): An integrated optic device according to claim 34 wherein said sol-gel derived film layer comprises a silica based glass.

Claim 36 (previously presented): An integrated optic device according to claim 34 wherein said substrate comprises glass.

Claim 37 (previously presented): An integrated optic device according to claim 34 wherein said substrate comprises silicon and includes a surface layer of silicon dioxide.

Claim 38 (previously presented): An integrated optic device according to claim 34 wherein the different photoinduced indices of refraction along the axis of said channel define a grating.

Claim 39 (previously presented): An integrated optic device according to claim 34 wherein the different photoinduced indices of refraction along the axis of said channel comprise a continuous variation in the index of refraction along the axis of said channel.

Claim 40 (canceled)

Claim 41 (currently amended): An integrated optic device ~~according to claim 40~~ comprising:

(a) a substrate; and

(b) a photosensitive sol-gel derived film layer disposed on said substrate, said sol-gel film comprising a plurality of embedded waveguide channels each having a different photoinduced

refractive index profile along its axis, wherein said sol-gel film further comprises a glass, and wherein each waveguide channel comprises a different concentration of photodeposited metal oxide than that of the other waveguides in said plurality.

Claim 42 (currently amended): An integrated optic device according to ~~claim 40~~ claim 41 wherein said glass is a silica based glass.

Claim 43 (currently amended): An integrated optic device according to ~~claim 40~~ claim 41 wherein said substrate comprises glass.

Claim 44 (currently amended): An integrated optic device according to ~~claim 40~~ claim 41 wherein said substrate comprises silicon and includes a surface layer of silicon dioxide.

Claim 45 (currently amended): An integrated optic device according to ~~claim 40~~ claim 41 wherein said plurality of channels define a waveguide array.

Claim 46 (currently amended): An integrated optic device according to ~~claim 40~~ claim 41 wherein each of the refractive index profiles for said plurality of channels comprises a variation in the index of refraction along the axis of said channels.